

TITLE: OBTAINING FATTY ACIDS FOR BIODIESEL PRODUCTION THROUGH THE GROWTH OF MICROALGAE IN A SYSTEM SUPPLEMENTED WITH GLYCEROL

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ABSTRACT:

Microalgae systems show a great potential in the production of bioenergy and wastewater treatment. Research on alternative sources of microalgae growth, such as residual glycerol, may contribute to the viability of biodiesel production. The objective of this study was to analyze the growth of natural microalgae and the composition of their fatty acids using effluent as a culture medium supplemented with different concentrations of glycerol. This study was carried out at the microalgae laboratory from the Excellence Center of Oleochemical and Biotechnological Products and Processes, University of Santa Cruz do Sul (UNISC), and the culture medium used was taken from the Wastewater Treatment Plant-UNISC. The biomass yield was calculated on dry weight after the samples were centrifuged. The oil extraction was done by the Bligh & Dyer method from lyophilized biomass and the identification of fatty acids by gas chromatography. The pilot scale growth of microalgae was carried out in 2.5 L photobioreactors, with constant luminosity, temperature of 25 °C and air supply through diaphragmatic pumps. Glycerol was added at concentrations of 7.5, 10.4 and 12.5 g.L⁻¹, in triplicate. The concentration that showed a better yield was 12.5 g.L⁻¹ with 3.778 ± 1.121 g.L⁻¹ of biomass and 0.135 ± 0.008 g.L⁻¹ of lipids. The profile of the fatty acids found in all experiments, mainly in C14: 0, C18: 0, C18: 2, C20: 0, increased with the addition of glycerol in relation to the controls, achieving an oil profile with good quality for biodiesel production. This initiative to increase the production of oils using glycerol in autochthonous microalgae and to promote their growth in conditions of remediation of eutrophic compounds, such as nitrogen and phosphorus, is a sustainable possibility which can collaborate to make the process of obtaining biodiesel economically viable.

Keywords: microalgae, wastewater, glycerol, fatty acids, biodiesel.